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ABSTRACT

Technical writing instructors lack a framework for evaluating pedagogical materials. One framework for classification divides the pedagogical materials into three groups: those locating their heuristics in form, context, and method. Formal pedagogies (the modes, sentence generation) can produce generic writing, separated from audience, purpose, and situation. Contextual pedagogies (two based on the communication triangle--a sender, a receiver, and a subject to which the communication refers) can produce either generic or highly individual writing. Methodological pedagogies (the composing process, problem solving) give a procedure applicable to any writing task. The richest material combines heuristics. Such a classification generates three questions that must be considered when evaluating material: (1) Is the material based on sound theory and does it offer a heuristic for the writing task? (2) Will the heuristic generate meaningful writing or will generic writing be the result? and (3) If several theories inform the material, does the dominant heuristic provide clear and effective direction for the writing task? (HOD)

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The Heuristics of Pedagogy:

Approaches to Teaching Technical Writing

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Abstract

Professors lack a framework for evaluating pedagogical materials. These materials can be classified into three groups: those locating their heuristics in form, context, and method. Formal pedagogies (the modes, sentence generation) can produce generic writing, separated from audience, purpose, and situation. Contextual pedagogies (two based on the communication triangle) can produce either generic or highly individual writing. Methodological pedagogies (the composing process, problem solving) give a procedure applicable to any writing task. The richest material combines heuristics. These approaches with their heuristics allow systematic classification and evaluation of pedagogical materials.

THE HEURISTICS OF PEDAGOGY: APPROACHES TO TEACHING TECHNICAL WRITING

In "Research Methods in Composition," Christopher C. Burnham identifies a problem that has faced composition research: the need for a coherent framework by which to identify, classify, and evaluate research methods and results.[1] Technical-writing pedagogy now faces the same problem. Textbooks and journal articles appear, but many professors lack a theoretical framework for these materials. The result is that pedagogy becomes a mere cache of teaching tips and techniques because systematic classification and evaluation, on the basis of theory, cannot occur.

In this article, I address this problem by discussing a classification and a means of evaluation. First, I divided technical-writing pedagogy on the basis of the heuristics offered for the writing act. (I chose heuristics as my basis because they are intimately related to composition pedagogy. The function of a heuristic is to produce meaningful writing, the ultimate goal of composition pedagogy.) I then classified heuristics, grouping pedagogies that base their discovery techniques in form, in context, and in method.[2] Within these groups, I further differentiated pedagogies on the basis of theory. The following taxonomy was the result:

Form

- The modes
- Sentence generation

Context

- The communication triangle

Method

- The composing process
- Problem solving

Finally, I evaluated pedagogies according to the efficacy of the heuristic involved: Was it likely to produce meaningful writing, or would inferior products be the result?

Pedagogical Approaches to Technical Writing

Form

The Modes

Theory

This approach derives from 19th century conceptions of rhetoric, which classified discourse on the basis of form. For example, Alexander Bain, who popularized this approach, identified four modes: description, narration, exposition, and argumentation. Because each of these modes had its own function, content, organizational pattern, and style, they were seen as genre or forms rather than as ways to develop material.[3]

Heuristic

Form is the heuristic for this approach because the modes act as predetermined schema, generating many rhetorical features. That is, once writers have identified the mode to which a given piece of discourse belongs, many of their decisions on content, organization, and style are also made.

The influence of the modal approach, which has dominated composition in the past, can be seen in a best-selling technical-writing text: Houp and Pearsall's Reporting Technical Information.[4] Houp and Pearsall identify four modes, for which they use Bain's terms (exposition, narration, description, and argumentation). Houp and Pearsall also give the associated characteristics for each mode, as the following excerpts for narration and argumentation illustrate:

Function: "Narration tells a story--in technical writing, a factual story." (124) "The intention of argument is to convince your audience that your opinions are correct."(142)

Content/

Organization: "Narration relates a series of events in an ordered sequence, usually chronological." (124)

"The major technique of argument is the use of a major proposition followed by a series of supported minor propositions." (142)

Style: "For the most part, such narration is related in a business-like way. Sometimes, however, the writer may choose to use narration more dramatically . . ." (125)

"Support your case with simply stated verifiable facts and statements from recognized authorities." (142, my emphasis)

These modes with their associated characteristics then become a heuristic for generating technical documents. As Houp and Pearsall say,

> These are the basic modes of discourse from which all technical reports stem. The modes are strategies that enable you to present your material in a persuasive way. (99, my emphasis)

In particular, the modes are seen as building blocks for these documents:

> Narration is frequently used in technical writing to provide a historical overview that will aid the reader in understanding some exposition that is to come. (125)

. . . the discussion sections of many scientific and technical reports are often rather subtle and understated arguments. (143)

According to Houp and Pearsall, then, knowing the modal forms is the heuristic that produces meaningful writing.

Evaluation

The modes are an appealing heuristic because of their neatness and ease: With their associated characteristics, they provide ready-made answers to the difficult questions of content, organization, and style that any composing task can raise. However, this approach has the significant drawback of simplification. The individuality of each writing task, as influenced by audience, purpose, and context, can be forgotten in favor of applying a generic form. "Recipe" writing can be the result, where the modes become fixed forms rather than patterns of organization used for developing material.[5]

Sentence Generation

Theory

Sentence generation is based on the work of Francis Christensen.[6] According to Christensen, rhetoric should begin at sentence level because work with this smaller unit most effectively trains the students to write longer types of discourse. Of course, the sentence is not viewed in isolation but is related to a writer's purposes and goals for composing. As Glenn Broadhead has said, ". . . an initial focus on pattern or form (in sentences) is an effective pedagogical technique for showing <u>what</u> the larger goals are while showing <u>how</u> they are achieved through manipulation of structures."[7] This fact is true because longer sections of discourse can be manipulated in the same ways as sentences: Levels of structure are analogous.

Heuristic

In sentence generation, the heuristic directing the writing process is manipulation of form or structure, beginning with the sentence. Two types of units within sentences can be distinguished: independent clauses and free modifiers (parts of sentences that can be punctuated but are not independent clauses). Certain types of free modifiers, called developmental modifiers, can develop a thought by means of any of the traditional modes. In addition, varying the placement of free modifiers creates different meanings and effects. Thus, work with sentences effectively teaches the various structures and thier uses.

Sentences can then be tied together into larger units using other free modifiers that serve transitional, linking, or referencing functions. Because these larger units are analogous to sentences, manipulating the form of the sentence has served as an inductive heuristic.

Evaluation

The strength of this heuristic is its stress on manipulating structure. Adherents of this approach attest that it does produce writers who understand the structural components of discourse. These writers compose more syntactically mature sentences; they use more free modifiers and punctuate them accurately; they understand how to work with structure.

However, problems arise if sentence generation is seen as an end in itself, separate from the context that gives rise to composing. In this case, sentence generation becomes an empty exercise in form, where students understand how to generate sentences but may not understand how this knowledge connects with reader needs.[8]

Context

The Communication Triangle

Theory

The communication triangle is a concept derived from communication theory. Although this triangle has been represented in different ways, all representations include at least a sender, a receiver, and a subject to which the communication refers. The communication then results from a relationship among the elements of this triangle.

The communication triangle has served at least two purposes in discourse theory. First, the triangle has been used by theorists such as James Kinneavy and James Moffett to classify types of discourse. Kinneavy identifies four types, on the basis of the particular element stressed: expressive (writer), persuasive (reader), referential (subject), and literary (signal).[9] Moffett also identifies four types, on the basis of relative distance among elements: drama (what is happening), narrative (what happened), exposition (what happens), and logical argumentation (what may happen).[10]

For Kinneavy, each type of discourse also has its aim, which determines its content, organizational patterns, and style. As he says,

> Aim determines everything else in the discourse . . . the mode of discourse, art of discourse, and the semantic and syntactic components of language are all functions of the aim of discourse. (48)

For Moffett, each type of discourse involves its own skill (recording, reporting, generalizing, or theorizing),[11] each of which has its place on a developmental scale.

Besides its use in classifying types of discourse, the communication triangle has served a second purpose in discourse theory: The triangle's

articulation of the elements of a communication is implicit in much of the recent work on writer, reader, purpose, and situation, as these factors influence composing. For example, interesting studies have been published on types of audiences and on the connections between reading patterns and composing.[12] Other research is being done on the influence of the corporate environment on composing.[13] All of this work shows that the elements of the triangle--the individual context out of which a communication grows and the relationships between writers and readers--have very important implications for composing.

Heuristic

The two directions inherent in this approach give rise to two very different heuristics.

Classification. Although this classification begins with context, its purpose has been to distinguish forms: the basic patterns of discourse. Once these forms with their associated characteristics are derived, the heuristic is similar to that for an approach based on modes: Many composing decisions are already made when the type of discourse has been determined.

Influence of Writer, Reader, Purpose, and Situation. Here the heuristic involves a consideration of these elements in both their individual (e.g. the particular reader of a communique) and their generic (e.g. the concept of an ideal reader) aspects. This consideration occurs each time a writer beings to compose and is the basis for decisions on content, arrangement, and style.

Evaluation

Classification can be evaluated in a similar way to the approach based on modes. The classification can be neat and easy to apply, but it can oversimplify the composing task and may produce generic writing, if the classification is the only heuristic used.

The influence of writer, reader, purpose, and situation has the opposite problem of complexity. Many of these contextual factors must be reinvented for each writing task and new composing decisions must be made. Thus, inexperienced writers can become overwhelmed by the seeming disorder of the process. Moreover, used by itself, this approach does not suggest any sequence for making these decisions: No systematic way of proceeding is provided.[14]

Method

The Composing Process

Theory

An approach centering around the composing process is based on recent research concerning the way people write. Janet Emig's The Composing Processes of Twelfth Graders (1971) sparked this research by shifting interest from the products of writing to the process itself. Since Emig, various researchers have divided the composing process into stages, with Gordon Rohman's designations remaining most common: prewriting, writing, rewriting.[15] Researchers following Rohman have stressed the repetitive and reflexive nature of these stages: Writers proceed backwards and forwards among the operations involved.[16] Thus, prewriting acts (e.g. discovery of material) can and do occur during writing. The same is true of rewriting acts.

Heuristic

The heuristic for an approach based on the composing process is the series of steps for carrying out writing tasks. Because writing is a process, its various major divisions (the stages) can be accomplished through these steps. Because writing is a non-linear process, the steps can be repeated in any order any number of times. Thus, the steps generate writing and constitute a method for approaching any writing situation.

As an example, one new technical-writing text identifies the following prewriting, writing, and rewriting steps:

Prewriting

Analyzing audience and purpose/use

Gathering information

Selecting appropriate content

Arranging material

Planning style

Writing

Writing drafts

Rewriting

Revising for amount/kind of detail, appropriate emphasis, logical progression, and stylistic appropriateness

Editing for mechancial accuracy[17]

The text then provided methods for carrying out these steps, in relation to common types of technical documents. The resulting heuristic is a set of instructions for each writing task.

Evaluation

The strength of this heuristic is its methodology. Unlike the heuristics based on form or context, the heuristic for this approach outlines a procedure, thus providing inexperienced writers with a means of accomplishing writing tasks. In addition, because this heuristic focuses on procedure rather than form, the heuristic does not encourage generic writing.

However, the heuristic has the following drawbacks:

1. Delineating the stages and steps in arriving at a product, rather than concentrating on the writer's mental processes

2. Simplifying the composing process, because the concept of non-linearity is difficult to convey

These two drawbacks can result in a mechanized view of process, where composing is seen as a procedure that occurs without writer input, variations, or indirections, and where the writer arrives neatly at a finished product. Thus, the real complexity of the composing process can be forgotten.[18]

Problem Solving

Theory

Problem solving is based on the findings of cognitive psychologists, most recently introduced into composition by Linda Flower and John Hayes.[19] Rather than focusing on the steps in the writing process, Flower and Hayes examine the writer's mental processes. They have divided these processes into three large groups (planning, generating, and reformulating), each of which contains several hierarchically arranged sub-processes. Writers can call on any of these sub-processes at any time by embedding them in another process.[20]

In addition, Flower and Hayes view writing as a goal-directed activity. These goals are also hierarchical, with abstract goals at the top that become increasingly more specific as writers discover ways to carry them out.

Heuristic

The heuristic for the problem-solving approach is the concept of processes and goals: A communication is generated when writers call on certain mental processes and when they articulate their goals. Flower's text, Problem-Solving Strategies for Writing, demonstrates how this procedure is carried out, thus providing a method that can be applied to any writing task.

Evaluation

The strength of problem solving's heuristic is the same as that for the composing process: Because problem solving provides methodology and not form, it does not encourage generic writing.

The drawback of problem solving is its complexity. Mental processes are difficult to isolate and study, as Flower and Hayes freely admit and as other researchers have been quick to point out.[21] Thus, teaching writers how to follow those complex mental processes and build complex goal networks is also difficult. The danger is that simplifying the theory will lead to mechanization, as with an approach based on the composing process.[22]

The classification and evaluation I have discussed can be used when considering pedagogical material. First, is the material based on sound theory and does it offer a heuristic for the writing task? Much available material aggravates the problem professors face by giving mere teaching tips divorced from a coherent theoretical framework and heuristic.[23]

Second, will the heuristic generate meaningful writing or will generic writing be the result? I suggest that heuristics based on method are most useful. Because of their concentration on procedure, these heuristics avoid the problem of generic writing that heuristics based on form or content (classification of discourse) can face. Because heuristics based on method can be applied to any writing task, they avoid the problem of reinvention that a focus on contextual factors (writer, reader, purpose, and situation) can produce.

Third, if several theories inform the material, does the dominant heuristic provide clear and effective direction for the writing task? Much available material uses a combination of the heuristics I have discussed. For

example, the contextual heuristic of writer, reader, purpose, and situation and the formal heuristics of the modes and sentence generation can be used in an approach based on the composing process. This mixture of heuristics makes for some of the richest material that can be found. However, the dominant heuristic must then be evaluated for its influence on writing tasks.

This evaluation is essential for improving pedagogy. The evaluation will allow professors to sort out the wealth of technical-writing material they see and make more informed selections for their courses. Ultimately, then, evaluating technical-writing materials will help professors offer more effective instruction and train more competent technical writers.

Notes

1. "Research Methods in Composition," in Research in Composition and Rhetoric: A Bibliographic Sourcebook, eds. Michael G. Moran and Ronald F. Lunsford (Westport CT: Greenwood press, 1984), pp. 191-192.

2. I am indebted to Dr. Helen Rothschild Ewald for assistance with this classification.

3. Frank D'Angelo's chapter on the modes in Teaching Composition: Ten Bibliographical Essays gives comprehensive background on the modes. See "Modes of Discourse," in Teaching Composition: Ten Bibliographical Essays, ed. Gary Tate (Fort Worth, TX: Texas Christian University Press, 1976), 111-135. Robert J. Connors also provides a brief historical overview as well as a critique of the modes. See "The Rise and Fall of the Modes of Discourse," College Composition and Communication, 32 (December, 1981), 444-455. D'Angelo also critiques use of the modes in "Nineteenth-Century Forms/Modes of Discourse: A Critical Inquiry," College Composition and Communication, 35 (February, 1984), 31-42. In particular, D'Angelo concludes that these modes were viewed as generic types of discourse rather than as patterns of development.

4. Kenneth Houp and Thomas Pearsall, Reporting Technical Information, 5th edition (New York, NY: Macmillan Publishing Co., 1984). Subsequent parenthetical references in the text are to this edition.

5. Houp and Pearsall's text is the best-known modal text on the market. However, Houp and Pearsall do not integrate their discussion of the modes sufficiently with audience and purpose, and with their discussion of technical documents. A second modal text is Mary Vay's: Strategies for Technical Writing. A Rhetoric with Reading (New York, NY: Holt, Rinehart, and Winston, 1982). Dr. Vay sees the modes as means of developing material and thus more completely integrates audience, purpose and modes.

6. See, in particular, Francis Christensen and Bonniejean Christensen, Notes Toward a New Rhetoric (New York, NY: Harper and Row, 1978).

7. See "Sentence Patterns: Some of What We Need to Know and Teach," in Sentence Combining: Toward a Rhetorical Perspective, eds. Donald A. Daiker, Andrew Kerek, and Max Morenberg (Carbondale, IL: Southern Illinois University Press, forthcoming).

8. In "Sentence Combining in a Rhetorical Framework: Directions for Further Research," Stephen L. Harris and Stephen P. Witte address this problem. See Reinventing the Rhetorical Tradition, eds. Aviva Freedman and Ian Pringle (Conway, AK: L & S Books, 1980), pp. 89-98.

Only one text based on sentence generation is currently on the market -- James De George, Gary A. Olson, and Richard Ray, Style and Readability in Technical Writing. A Sentence-Combining Approach (New York, NY: Random House, 1984). However, the following articles discuss aspects of this method: Glenn J Broadhead, "Sentence Skills for Technical Writers," Journal of Technical Writing and Communication, (1981), 139-150; Mary Rosner and Terri Paul, "Using Sentence Combining in Technical Writing Classes," The Technical Writing Teacher, 10 (1982), 35-40; Mary Rosner, "Sentence-Combining in Technical Writing: An Editing Tool," The Technical Writing Teacher, 9 (1982), 100-107; Michael Stugrin, "Sentence-Combining, Conceptual Sophistication, and Precision in Technical Exposition," The Technical Writing Teacher, 7 (1979), 28-34.

9. See A Theory of Discourse (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1971), pp. 19-ff. Kinneavy also explicitly traces his work and Moffett's to the semiotic triangle in "A Pluralistic Synthesis of Four Contemporary Modes for Teaching Composition," in Reinventing the Rhetorical Tradition, pp. 37-52.

10. See Teaching the Universe of Discourse (Boston, MA: Houghton Mifflin Co., 1968), p. 35.

11. Ibid.

12. For example, see Donald B. Parks, "The Meanings of 'Audience'," College English, 47 (January, 1985), 12-29, on audience; Louise Wetherbee Phelps, "Dialectics of Coherence: Toward an Integrative Theory," College English, 47 (January, 1985), 12-29, and the February, 1982, issue of College Composition and Communication, on connections of reading and writing.

13. In particular, see Lee Odell and Dixie Goswami, eds. Writing in Nonacademic Settings (Gilford, CT: Guilford Press, 1985). Also see Glenn Broadhead and Richard C. Freed, Process and Product in Real-World Revising. NCTE Studies in Writing and Rheotric (Carbondale, IL: Southern Illinois University Press, forthcoming in 1985).

14. The contextual approach is not as yet represented by any complete technical-writing textbook. However, in "Applications of Kinneavy's Theory of Discourse to Technical Writing," College English, 40 (February, 1979), 625-632, Elizabeth Harris applies Kinneavy's concept to technical writing. Numerous articles also discuss aspects of writer, reader, purpose, and situation. In addition, this contextual heuristic forms a part of all technical-writing texts.

15. See "Pre-Writing: The Stage of Discovery in the Writing Process," College Composition and Communication, 16 (May, 1965), 106-112.

16. Sharon Pianko stresses this operation in "Reflection: A Critical Component in The Writing Process," College Composition and Communication, 30 (1979), 275-278. See also Pianko, "A Description of the Composing Processes of College Freshman Writers," Research in the Teaching of English, 13 (1979), 5-22; Sondra Perl, "The Composing Process of Unskilled Writers at The College Level," Research in the Teaching of English, 13 (1979), 317-336; Perl, "Understanding Composing," College Composition and Communication, 31 (December, 1980), 363-369. In addition, Nancy Sommers has stressed the reflexive quality of revision. See "Revision Strategies of Student Writers

and Experienced Adult Writers," College Composition and Communication, 31 (December, 1980), 378-388.

17. See Nancy L. Roundy with David Mair, Strategies for Technical Communication (Boston, MA: Little, Brown, 1985).

18. Two other textbooks besides the Roundy/Mair text base their heuristics on the composing process. See Thomas L. Warren, Technical Writing: Purpose, Process, and Form (Belmont, CA: Wadsworth Publishing Co., 194); Peter Sandman, Carl Klompus, and Betsey Yarrison, Scientific and Technical Writing (New York, NY: Holt, Rinehart and Winston, 1985).

19. See especially "A Cognitive Process Theory of Writing," College Composition and Communication, 31 (February, 1980), 21-32, and "The Dynamics of Composing: Making Plans and Juggling Constraints" in Cognitive Processes in Writing: An Interdisciplinary Approach, eds. Lee Odell and Erwin Steinberg (Hillsdale, NJ: Lawrence Erlbaum Associates, 1980), pp. 31-50.

20. "A Cognitive Process Theory of Writing," 366-367.

21. See Marilyn Cooper and Michael Holzman, "Talking About Protocols," College Composition and Communication, 34 (October, 1983), 284-293.

22. One new text bases its heuristic in problem solving: Patricia A. Robinson, Fundamentals of Technical Writing (Dallas, TX: Houghton Mifflin, 1985).

23. Many textbooks currently on the market fall into this category and ought to be evaluated accordingly.